TITLE OF THE INVENTION

WEIGHT DETECTING DEVICE FOR MICROWAVE OVENS

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of Korean Application No. 2003-1577, filed January 10, 2003, in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention relates, in general, to weight detecting devices for microwave ovens and, more particularly, to a weight detecting device for microwave ovens which is used to detect a weight of food placed on an exterior casing of a microwave oven.

2. Description of the Related Art

[0003] FIG. 1 is a side sectional view of a microwave oven having a conventional weight detecting device.

[0004] As illustrated in FIG. 1, a microwave oven includes an interior casing 1 and an exterior casing 3. A guide plate 4 having a shelf shape is provided in a space defined between a top plate 2 of the interior casing 1 and the exterior casing 3. In the microwave oven of FIG. 1, the guide plate 4 is spaced apart from the top plate 2 of the interior casing 1 by a predetermined height, thus preventing heat from being transmitted from the interior casing 1 through the top plate 2 of the interior casing 1 to the guide plate 4. A weight sensor 5 is provided at a center of the guide plate 4.

[0005] In a conventional weight detecting device, the weight sensor 5 has a form of a piezoelectric element which is sensitive to a variation in temperature. Thus, to minimize a heat

conduction from the interior casing 1 to the guide plate 4, the guide plate 4 is spaced apart from the top plate 2 of the interior casing 1 by a predetermined height and to surround the weight sensor 5.

[0006] However, the conventional weight detecting device has a problem that the guide plate 4 thereof surrounds the weight sensor 5, so a space to install the weight sensor 5 is increased and the size of the guide plate 4 is undesirably increased.

[0007] The conventional weight detecting device has another problem that the weight sensor 5 thereof has the form of the piezoelectric element, so a gap between the guide plate 4 and the top plate 2 of the interior casing 1 must be increased so as to minimize the heat conduction from the interior casing 1 to the guide plate 4, thus increasing a space to install the weight sensor 5.

SUMMARY OF THE INVENTION

[0008] Accordingly, it is an aspect of the present invention to provide a weight detecting device for microwave ovens, which is designed to minimize a space to install a weight sensor and to minimize heat conduction from an interior casing through a top plate of the interior casing to the weight sensor.

[0009] Additional aspects and/or advantages of the invention will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the invention.

[0010] The above and/or other aspects of the present invention are achieved by providing a weight detecting device for microwave ovens, including a weight detecting unit supported at an end thereof and detecting a weight according to a force applied to a free end thereof, and a support unit to support the weight detecting unit.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] These and/or other aspects and advantages of the invention will become apparent and more readily appreciated from the following description of the preferred embodiments, taken in conjunction with the accompanying drawings of which:

[0012] FIG. 1 is a side sectional view of a microwave oven having a conventional weight detecting device;

[0013] FIG. 2 is a perspective view of a microwave oven having a weight detecting device according to an embodiment of the present invention;

[0014] FIG. 3 is a partial sectional view of the microwave oven including weight detecting device illustrated in FIG. 2; and

[0015] FIG. 4 is an exploded perspective view of the weight detecting device illustrated in FIG. 3.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0016] Reference will now be made in detail to the present preferred embodimentof the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout.

[0017] FIG. 2 is a perspective view of a microwave oven having a weight detecting device according to an embodiment of the present invention.

[0018] As illustrated in FIG. 2, a microwave oven 8 includes a machine room 10 in which a magnetron (not shown) irradiating microwaves is installed. The microwave oven 8 further includes an interior casing 11 partitioned from the machine room 10. The magnetron irradiates microwaves into the interior casing 11. An exterior casing 12 surrounds the interior casing 11 and defines the machine room 10 therein and maintains a predetermined gap between the interior and exterior casings 11 and 12.

[0019] A control panel 13 is mounted to a front of the machine room 10 to control an operation of the microwave oven 8. A door 14 is mounted to a front of the interior casing 11 so as to selectively open or close the interior casing 11.

[0020] A weight detecting device 15 is provided at a space between a top plate 20 (see FIG. 3) of the interior casing 11 and a top plate 25 (see FIG. 3) of the exterior casing 12. The weight detecting device 15 includes a weight detecting unit 40 and a support unit 41. The weight detecting unit 40 operates to detect a weight of food which is placed on the exterior casing 12. The support unit 41 operates to support the weight detecting unit 40 at a position spaced apart from the top plate 20 of the interior casing 11 by a predetermined height preventing heat from being transmitted from the interior casing 11 to the weight detecting unit 40. The weight detecting unit 40 detects the weight of the food placed on a food seating unit 16 which is provided on the exterior casing 12.

[0021] FIG. 3 is a partial sectional view of the microwave oven 8 including the weight detecting device illustrated in FIG. 2. FIG. 4 is an exploded perspective view of the weight detecting device illustrated in FIG. 3.

[0022] As illustrated in FIGS. 3 and 4, a weight sensor 22 has a bar shape of a predetermined length, and is supported at an end thereof by a support bracket 21. Further, a shaft 23 acting as a force transmitting unit is mounted to a free end of the weight sensor 22 so as to be perpendicular to the free end to transmit a force applied to the food seating unit 16 of the exterior casing 12 to the free end of the weight sensor 22.

[0023] Screw holes 22b are provided at a fixed end of the weight sensor 22 so that the weight sensor 22 is screwed to the support bracket 21. A screw hole 22c is provided at the free end of the weight sensor 22 to receive the shaft 23. The shaft 23 may be externally threaded, while the screw hole 22c may be internally threaded, so that the shaft 23 is tightened to the screw hole 22c. Further, at least one heat dissipating hole 22a is provided at a predetermined portion of the weight sensor 22 to allow the weight sensor 22 to be easily bent in response to a load applied to the free end of the weight sensor 22 and to dissipate heat. Upper and lower sensing elements 22d are provided on upper and lower surfaces of a central portion of the weight sensor 22, respectively. When the weight sensor 22 is bent in response to the load applied to the free end of the weight sensor 22, the upper surface having the upper sensing element 22d is expanded while the lower surface having the lower sensing element 22d contracts, so an internal resistance of the upper and lower sensing elements 22d is varied.

[0024] Since the weight sensor 22 is made of an elastic material, the weight sensor 22 is bent by a force applied to the shaft 23 mounted to the free end of the weight sensor 22. A weight of the food

is detected based on a variation in the internal resistance of the sensing elements 22d which are varied according to a displacement of the bent weight sensor 22.

[0025] Further, the support bracket 21 is made of steel, and has two fixing parts 27 so as to be screwed to the top plate 20 of the interior casing 11. A screw hole 21a is formed at a predetermined position of each of the fixing parts 27 so that the support bracket 21 is screwed by screws 26 to the top plate 20 of the interior casing 11. The support bracket 21 has a support part 21c which is upwardly bent from the fixing parts 27, thus allowing the weight sensor 22 to be supported at the position spaced apart from the top plate 20 of the interior casing 11 by the predetermined height. The support part 21c is provided with screw holes 21b corresponding to the screw holes 22b which are provided at the fixed end of the weight sensor 22.

[0026] The shaft 23 is provided with a support plate 23a and a rod 23b. The support plate 23a has a predetermined area to be inserted into the food seating unit 16. The rod 23b concentrates the force applied to the support plate 23a on the free end of the weight sensor 22. The rod 23b is tightened to the screw hole 22c of the weight sensor 22.

[0027] Further, the food seating unit 16 includes a tray bracket 28, a rubber packing 29, and a locking ring 30. The tray bracket 28 is integrated with the top plate 25 of the exterior casing 12. The rubber packing 29 is mounted to the tray bracket 28, thus allowing the food to be seated on the food seating unit 16. The locking ring 30 locks the rubber packing 29 to the tray bracket 28. A shaft receiving hole 28a is provided at a predetermined position of the tray bracket 28 to receive the support plate 23a of the shaft 23 such that the support plate 23a comes into contact with a lower surface of the rubber packing 29. At least one locking slit 28b is formed at at least one position along an outer circumference of the tray bracket 28 to lock the rubber packing 29 to the tray bracket 28. Locking projections 30a provided along an edge of the locking ring 30 are fitted into the locking slits 28b to lock the rubber packing 29 to the tray bracket 28.

[0028] The process of assembling the weight detecting device for microwave ovens of FIG. 3 will be described in the following with reference to FIG. 4.

[0029] First, the screw holes 21a provided on the fixing parts 27 of the support bracket 21 are aligned with screw holes 20a of the top plate 20 of the interior casing 11. Next, the screws 26 are

tightened to the aligned screw holes 20a and 21a to mount the support bracket 21 to the top plate 20 of the interior casing 11.

[0030] To mount the weight sensor 22 to the support bracket 21 using screws 27, the screw holes 22b of the weight sensor 22 are aligned with the screw holes 21b of the support bracket 21. In this case, only an end of the weight sensor 22 is supported by the support bracket 21 so as to be spaced apart from the top plate 20 of the interior casing 11 by a predetermined height, thus allowing a size of the support bracket 21 to be reduced. Further, the weight sensor 22 has a cantilever beam structure which is effectively resistant to temperature variation, and is supported by the support part 21c of the support bracket 21 to minimize heat conduction from the interior casing 11 through the top plate 20 of the interior casing 11 to the weight sensor 22 preventing the weight sensor 22 from being affected by a temperature of the interior casing 11.

[0031] Further, since the support bracket 21 is mounted to a position of the top plate 20 of the interior casing 11, a space to install the weight sensor 22 is considerably reduced. Heat transmitted through the support bracket 21 to the weight sensor 22 is dissipated through the heat dissipating holes 22a which are provided at the predetermined portion of the weight sensor 22.

[0032] After the weight sensor 22 is mounted to the support bracket 21, the rod 23b of the shaft 23 is tightened to the screw hole 22c which is formed at the free end of the weight sensor 22. An end of the weight sensor 22 is supported by the support bracket 21, so the weight sensor 22 is bent and a position thereof is varied when the force is applied through the shaft 23 to the free end of the weight sensor 22.

[0033] After the shaft 23 is mounted to the weight sensor 22, the support plate 23a of the shaft 23 is inserted into the shaft receiving hole 28a of the tray bracket 28, which is provided on the top plate 25 of the exterior casing 12, so that the shaft 23 is coupled to the tray bracket 28. The rubber packing 29 is mounted to the tray bracket 28 using the locking ring 30. Thus, when a load, such as food, placed on the rubber packing 29 is transmitted through the shaft 23 to the free end of the weight sensor 22, the weight sensor 22 is bent and the resistance of the sensing elements 22d of the weight sensor 22 is varied, so a weight of the food is detected.

[0034] As is apparent from the above description, a weight detecting device for microwave ovens is provided in which a weight sensor of a cantilever beam structure is effectively resistant to

temperature variation, to minimize a space to install the weight sensor and to prevent the weight sensor from being affected by a variation in temperature.

[0035] Further, the present invention provides a weight detecting device for microwave ovens, which is designed such that only a part of a weight sensor is supported by a support bracket, thus allowing a construction of the support bracket to be simple, therefore minimizing a space to install the weight sensor.

[0036] Although an embodiment of the present invention has been shown and described, it would be appreciated by those skilled in the art that changes may be made in the embodiment without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.